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ABSTRACT

Approaches to educational research are grouped into five major categories. The process-product approach correlates teacher behavior with student achievement. Aptitude-treatment-interaction researchers believe that their research will identify instructional methods that are particularly suitable for students with specific aptitudes. Researchers in the Carroll Model tradition consider the most important factor in explaining, predicting, and controlling student achievement is time for learning. The ethnographic approach has its roots in anthropology and was developed and used to study cultures, particularly cultures foreign to the researcher. Researchers favoring the cognitive information-processing approach have a great deal of interest in basic psychological processes thought to occur in a teacher's mind that organize and direct the teacher's behavior. (JD)

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Occasional Paper No. 24

FIVE FACES OF RESEARCH ON TEACHING

Christopher M. Clark

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Five Faces of Research on Teaching[1]

Christopher M. Clark[2]

What makes a good teacher? Many parents, educators, and behavioral scientists are asking this question. There are several different ways of approaching this basic question: Behaviorists ask which teacher behaviors are systematically and causally related to student achievement; cognitive psychologists study the mental processes thought to guide and determine teacher behavior; aptitude-treatment-interaction researchers ask what types of instructional treatment are most effective with different types of students; and ethnographers describe and interpret classroom life in terms of its social context.

In any field of inquiry, the answers developed are shaped by the form of the questions asked and the methods used to resolve them. The field of research on teaching is no exception. As I look at research on teaching I see five well-developed and different approaches to the analysis of teaching. To oversimplify a bit, the five approaches to research on teaching can be grouped into two broad categories: primarily quantitative approaches and primarily qualitative approaches. The quantitative approaches are the process-product approach, the aptitude-treatment-interaction approach, and the Carroll Model approach. The qualitative approaches are the ethnographic approach and the cognitive information processing approach.

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[1]A slightly different version of this paper will be published in the October 1979 issue of Educational Leadership.

[2]Christopher M. Clark is an MSU assistant professor of educational psychology and coordinator of IRT's Teacher Planning Project.

What follows is a discussion of each of these research approaches.

Quantitative Approaches

The three quantitative approaches to research on teaching share several goals and assumptions. First, the research objective is to discover laws or law-like statements about the relationship between teacher behavior and student achievement. These laws are expected to be applicable over a wide range of circumstances, that is, the search is for general laws. Second, there is an emphasis on observable behavior, particularly that of the teacher. Third, quantitative researchers tend to separate the act of teaching into many component parts or variables. Most experimental designs permit examination of only a few of these variables in any single study. Finally, the generally accepted criterion of excellence for research findings is the replication of those findings in subsequent studies.

The process-product approach. This approach differs from the other quantitative methods in that the research questions are more concerned with the average amount of learning or achievement accomplished by a group (e.g., a class) than measuring, predicting, or explaining individual differences in learning due to teacher behavior. Researchers in this tradition are more interested in what teachers and students have in common than in how they are different.

A typical process-product study consists of operationally defining a teacher behavior variable or set of variables (e.g., teacher praise), counting the frequency with which that behavior occurs in many classrooms for a fixed period of time, and statistically correlating the frequency of teacher behavior with average student achievement scores

measured at the end of the observation period. A statistically significant positive correlation between teacher praise and reading achievement, for example, would suggest that the more effective teachers use more praise. Experimental designs have also been used in which the teacher behavior studied was controlled at specified levels rather than allowed to vary naturally. From such experimental studies it is possible to draw strong inferences about the cause-effect relationships between teacher behavior and student achievement. (For a comprehensive review of process-product research, see Dunkin & Biddle, 1974.)

Aptitude-treatment-interaction approach. Researchers who use the aptitude-treatment-interaction approach (for a review, see Cronbach & Snow, 1977; Snow, 1976) or the Carroll Model approach[3] are concerned with adapting teaching to individual differences in students, but in distinctly different ways. Aptitude-treatment-interaction researchers believe that their research will identify instructional methods (treatments) that are particularly suitable for students who have specific personal characteristics (aptitudes). In other words, the guiding question for this type of research is, "Which teaching method is best for which kinds of students?"

Carroll model approach. Researchers in the Carroll Model tradition believe, in contrast, that the single most important factor in explaining, predicting, and controlling student achievement is time for learning.

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[3]Named after John B. Carroll who, in his seminar paper "A Model of School Learning," Teachers College Record 64, 723-33, 1963, proposed that school learning can be accounted for in terms of five factors, all of which are expressed in units of time. More recent research and development in this tradition includes the work of Benjamin S. Bloom and his colleagues on Mastery Learning, David Wiley and Annegret Harnischfeger's policy research on length of the school day and school year, and the work of the staff of the Far West Laboratory for Educational Research and Development Beginning Teacher Evaluation Study.

Therefore, this kind of research primarily investigates ways for teachers to optimize the amount of time that each student spends on each learning task, with the goal of maximizing achievement for all students. Implicit in the Carroll Model approach is the assumption that the effects of student aptitudes (of the sort of interest to aptitude-treatment-interaction researchers) can be wiped out by the powerful treatment of differential, individualized learning time.

A great deal has been learned from primarily quantitative research on teaching in its various forms. Process-product, aptitude-treatment-interaction, and Carroll Model researchers have described classroom interaction systematically and in great detail. They have shown the great natural variation in what teachers do and, especially through training experiments, have learned a great deal about how teacher behavior can be shaped and changed. But multiple studies of a few teacher behavior variables have turned up inconsistent results, and no general laws of the sort once hoped for have emerged from this body of work.

In the face of this "lawless" situation, many quantitatively-oriented researchers remain undiscouraged. Some have attempted to re-interpret this body of literature using statistical techniques such as a meta-analysis (Glass, 1976; Peterson, 1979), in which the results of many different studies of ostensibly the same variables are combined to permit more general and global conclusions than are possible from a few studies. Others advocate greater sophistication in classroom observation instruments, including the tracking of individual students as they interact with teachers (Brophy & Good, 1974). Still others suggest that experimental rather than correlational research will sort out the causal links between teacher behavior and student achievement

(Gage, 1978). The quantitative research going on today is much more sophisticated than studied conducted five or 10 years ago.

Qualitative Approaches

Other researchers on teaching have responded to the disappointments of primarily quantitative research in a different way. Rather than advocating refinement of the well-established tools of observation and analysis, they have changed their basic question. Rather than asking "What works?" or "What works with whom? they ask "What is happening here and why?" The main goal of this kind of inquiry is understanding the reasons why teaching is as it is. This primarily qualitative research is comprised of the ethnographic[4] and cognitive information-processing (see Clark & Yinger, 1977, for a review) approaches to research on teaching. Researchers hope that by asking "What is happening here and why?" they can achieve a satisfying and useful understanding of the forces that shape life in classrooms.

Like the primarily quantitative paradigms, the ethnographic and cognitive information-processing approaches share some assumptions and values. Teachers and students are seen as purposive agents whose thoughts, plans, perceptions, and intentions influence their behavior and moderate its effects. The social context in which teaching and learning take place is considered an important source of explanations for classroom phenomena. Much of this research is descriptive rather than prescriptive, and the description depends, in part, on teachers' and students' reports of their thinking, reasoning, and understanding of a given situation.

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[4]A special issue of Anthropology and Education Quarterly, May 1977, 8(2), is devoted to exploring qualitative/quantitative research methodologies in education.

Ethnographic approach. Ethnography differs from cognitive information-processing approaches in its disciplinary heritage and in some of its methods of inquiry. Ethnography has its roots in anthropology and was developed and used to study cultures, particularly cultures foreign to the ethnographer. The methods of participant observation, fieldwork, use of informants, and derivation of hypotheses from analysis of field notes have been refined and modified to fit the more familiar context of American schools. The ethnographer is committed to studying a whole social system by portraying it in terms credible to and understandable by its participants. Indeed, major questions in most ethnographic studies have to do with locating the boundaries of the "whole" and identifying the web of meaning shared by teachers and students.

Cognitive information-processing approach. Researchers favoring this approach have a great deal of interest in basic psychological processes thought to occur in a teacher's mind that organize and direct the teacher's behavior. The implied model of teaching is that the teacher is a rational and intelligent individual faced with a very complex situation. The way that a teacher, or any other rational agent, deals with complexity is to simplify it in some rational and adaptive way. In the language of cognitive psychology, the teacher enters a complex task environment and simplifies it by defining some small part of it as the problem space within which he or she will work. The basic psychological processes that affect how a teacher simplifies a task environment include judgment, decision making, attention, and short-term and long-term memory. Most of these basic processes have been investigated in the psychology laboratory, but none have been thoroughly studied in

realistic and complex educational settings.

Basic psychological processes like teacher judgment and decision making do not operate in a vacuum. Researchers using the cognitive information-processing approach must attend to the psychological and ecological contexts in which basic processes are embedded. The psychological context for teacher judgment and decision making is made up of the teacher's implicit theories or beliefs and values about teaching and learning. The ecological context includes all of the resources, external circumstances, administrative requirements, and other factors that limit, facilitate, and shape teacher and student thought and action.

In looking for naturally-occurring circumstances in which basic psychological processes and implicit theories might be seen in action, researchers have investigated the psychology of teacher planning. In the various kinds of planning that teachers do there are opportunities to study how their thoughts are translated into action in the classroom. This research has also led to long overdue attention to the so-called "empty classroom" (Jackson, 1968) as well as the active classroom populated with teacher and students. Another site for this kind of research on teaching is the information processing and decision making that goes on during classroom interaction. This line of research on teacher interactive decision making is concerned with how and under what conditions teachers decide to modify or abandon a course of instruction while it is under way (e.g., Peterson & Clark, 1978). Researchers seek to understand, among other things, what vital classroom signs teachers monitor and use to organize, guide, and maintain the learning environment.

Finally, researchers on teacher thinking tend to choose relatively open kinds of tasks as promising research sites. For example, in

research on teacher planning (Clark & Yinger, Note 1) it seems more profitable to work with teachers as they plan for the teaching of creative writing than for reading or mathematics. Reading and mathematics curricula are largely prescribed and embodied in commercially produced materials and learning systems. Teacher planning is largely taken care of by the publishers and authors of these systems. In contrast, very little curriculum material is available to support the teaching of writing. In such an open situation, researchers have an opportunity to learn about a wide range of teacher cognitive behavior as teachers plan, elaborate ideas, try them out mentally, implement activities in the classroom, and revise, reject, or transform the activities into routines. Teacher tasks that are not severely constrained by habit, prescribed materials, and procedures provide the most promising opportunities for the cognitive information-processing approach.

My identification of five approaches to research on teaching is somewhat arbitrary and personal and other researchers may come up with a sixth or seventh approach or collapse two or three of mine into a single approach. Indeed, I encourage them to do so, especially if their reasons for doing so are to better ask and answer the questions they have in mind. My purpose is merely to communicate the way that I categorize approaches to analysis of teaching in the hope that these concepts, distinctions, and methods of analysis will be helpful.

Educational research and practice cannot help but profit from a multiplicity of recognized and complementary ways of studying teaching. The field is young enough, the problems are difficult enough, and the approaches are different enough to permit and encourage complementary alliances rather than internecine warfare.

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